

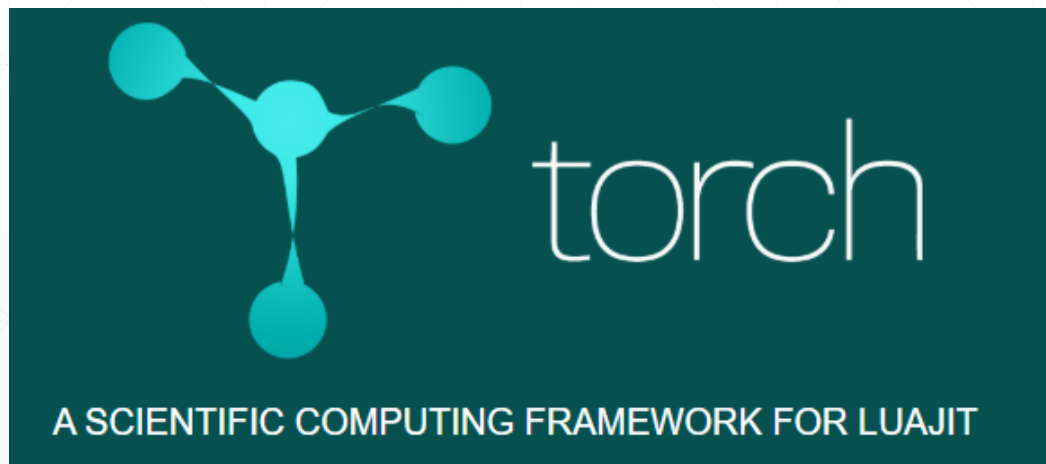


人生若只如初见

主讲人：龙良曲

Torch

- 2002年发布Torch
- 2011年发布Torch7

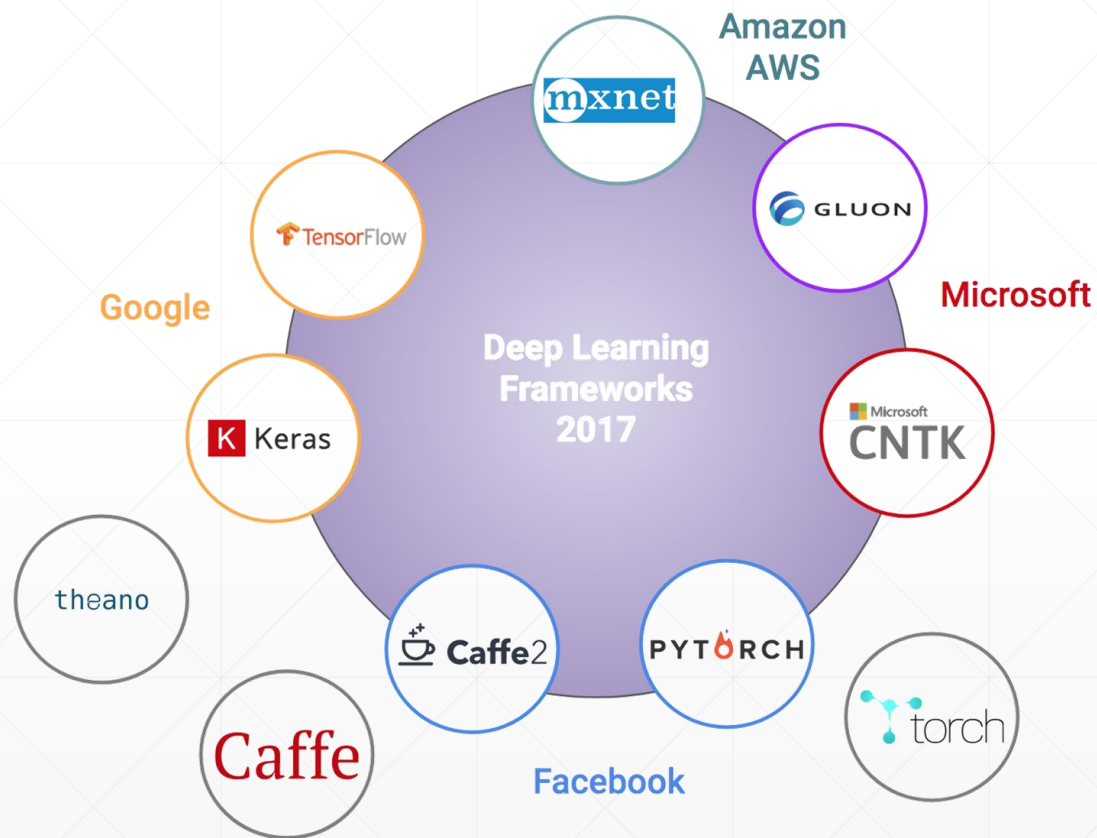


```
1 torch.Tensor{1,2,3}
2
3 function gradUpdate(mlp,x,y,learningRate)
4     local criterion = nn.ClassNLLCriterion()
5     pred = mlp:forward(x)
6     local err = criterion:forward(pred, y);
7     mlp:zeroGradParameters();
8     local t = criterion:backward(pred, y);
9     mlp:backward(x, t);
10    mlp:updateParameters(learningRate);
11 end
```

PyTorch

- 2016年10月发布0.1, THNN
 - 2018年12月发布1.0, Caffe2
 - Facebook, AI Research
-

百花争鸣



大浪淘沙

Theano

- TensorFlow
- TensorFlow eager

Torch7

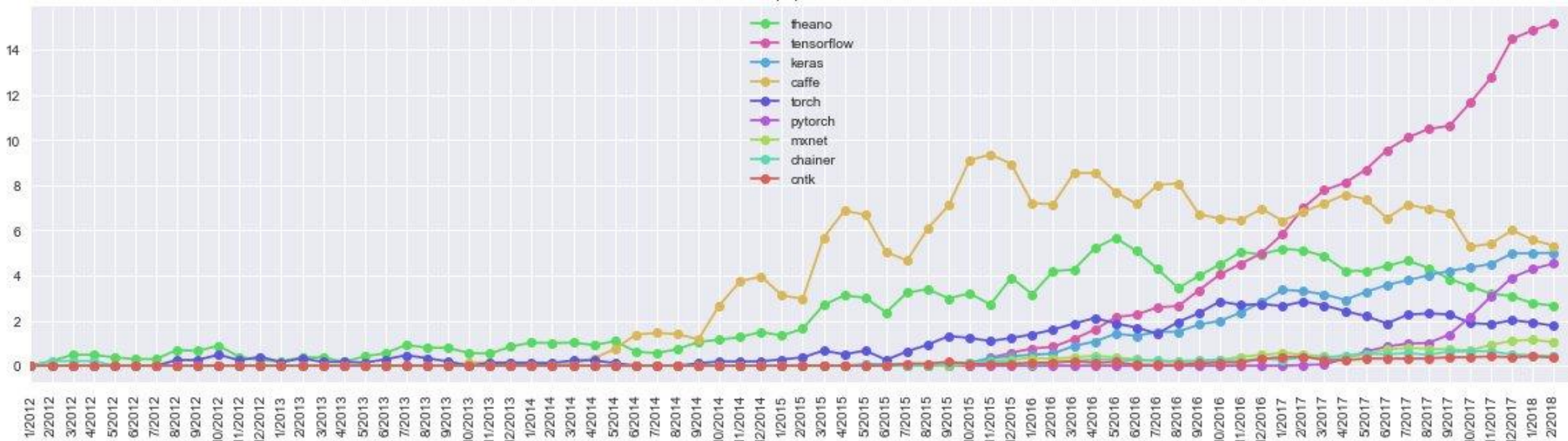
- PyTorch+THNN
- PyTorch+Caffe2

Caffe

- Caffe2
 - PyTorch 1.0
-

后来居上

Percent of ML papers that mention...



动态图



A graph is created on the fly

```
from torch.autograd import Variable

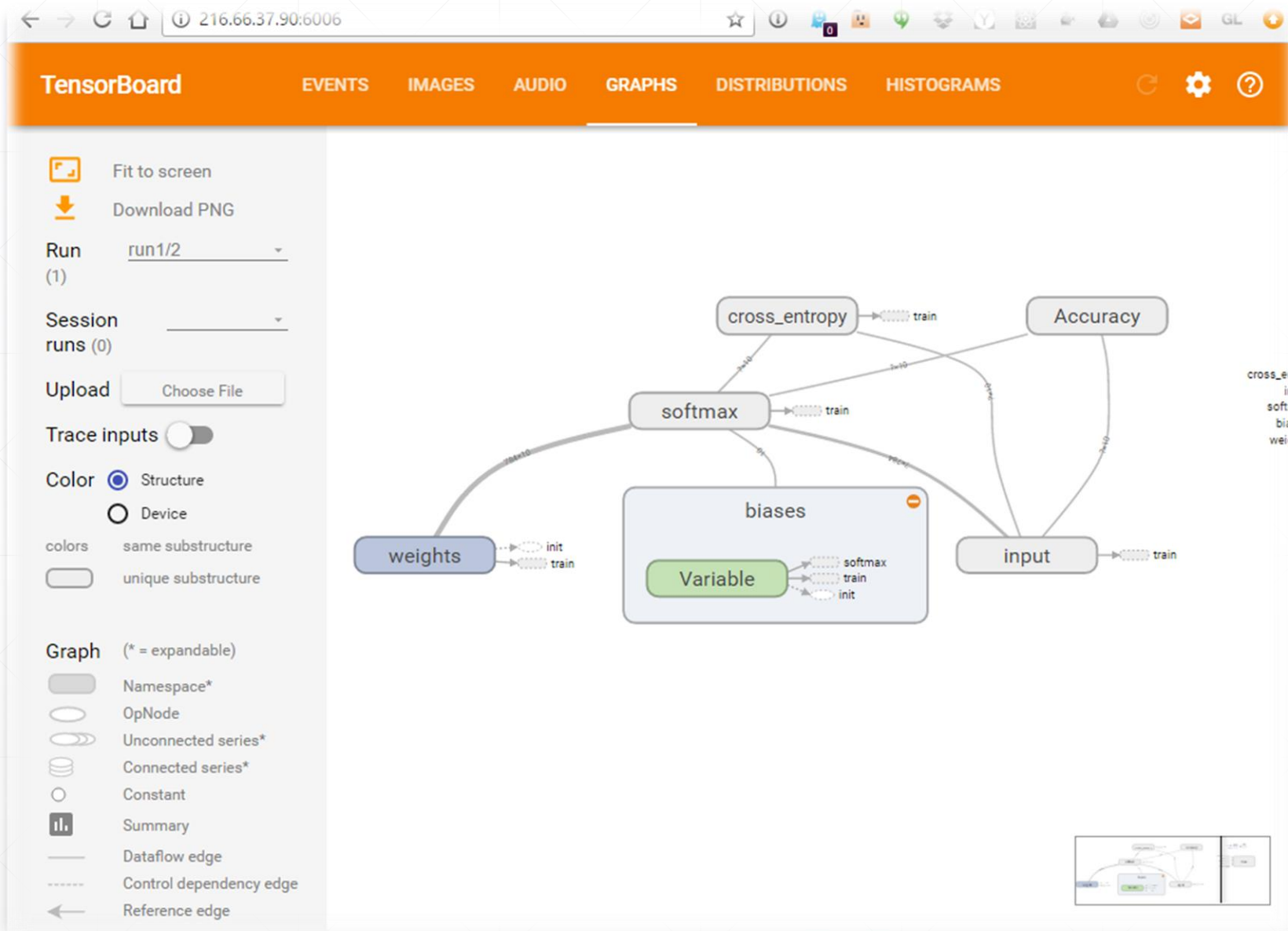
x = Variable(torch.randn(1, 10))
prev_h = Variable(torch.randn(1, 20))
W_h = Variable(torch.randn(20, 20))
W_x = Variable(torch.randn(20, 10))
```



静态图

- 自建命名体系
- 自建时序控制
- 难以介入

TensorFlow 2.0 => 动态图优先

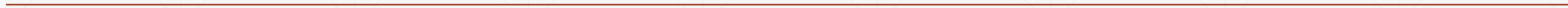


深度学习库能做什么？

- GPU加速
 - 自动求导
 - 常用网络层API
-

1. GPU加速

2. 自动求导



3. 常用API

Tensor运算

- Torch.add
- Torch.mul
- Torch.matmul
- Torch.view
- Torch.expand
- Torch.cat
- ...

神经网络

- Nn.Linear
 - Nn.ReLU
 - Nn.Conv2d
 - Nn.Softmax
 - Nn.Sigmoid
 - Nn.CrossEntropyLoss
-



下一节课

Thank You.
